

**CLAIMS**

1. An apparatus for processing an image signal which converts a first image signal constituted of plural items of pixel data into a second image signal constituted of plural items of pixel data, said apparatus comprising:

a plurality of frame memory portions for storing pixel data of a plurality of consecutive frames of the first image signal together with a motion vector that corresponds to the pixel data and lies between mutually adjacent frames;

data selection means for selecting plural items of pixel data located respectively in a time directional periphery and a space directional periphery with respect to a target position in the second image signal based on the plurality of frames stored in the plurality of frame memory portions; and

pixel data generation means for generating pixel data of the target position in the second image signal by using the plural items of pixel data selected by the data selection means,

wherein the data selection means selects:

plural items of pixel data located in the space directional periphery with respect to the target position from the frame memory portion in which a current frame in the first image signal is stored, said current frame corresponding to a frame in which the target position in the second image signal is present; and

plural items of pixel data located in the space directional periphery with respect to a position obtained by performing motion compensation on the target position by using the motion vector stored in the plurality of frame memory portions

together with the pixel data, from the frame memory portions in which frames before and after the current frame are stored.

2. The apparatus for processing an image signal according to  
5 claim 1, wherein the pixel data generation means comprises:

class detection means for detecting a class to which the pixel data of the target position in the second image signal belongs;

coefficient data generation means for generating coefficient data for an estimation equation that corresponds to the class detected by the  
10 class detection means; and

calculation means for obtaining, by calculations, the pixel data of the target position in the second image signal based on the estimation equation by using the coefficient data generated by the coefficient data generation means and the plural items of pixel data selected by the data  
15 selection means.

3. The apparatus for processing an image signal according to claim 2, wherein the class detection means detects the class to which the pixel data of the target position in the second image signal belongs, by  
20 using at least the plural items of pixel data selected by the data selection means.

4. The apparatus for processing an image signal according to claim 1, wherein each of the frame memory portions has a plurality of  
25 banks; and

wherein when the frame is divided in units of major block in which a plurality of minor blocks is arranged two-dimensionally, the minor

blocks located at different positions in the major block are stored in each of the plurality of banks.

5        5. A method for processing an image signal which converts a first image signal constituted of plural items of pixel data into a second image signal constituted of plural items of pixel data, said method comprising:

         a first step of storing pixel data of a plurality of consecutive frames of the first image signal in a plurality of frame memory portions together with a motion vector that corresponds to the pixel data and lies  
10 between mutually adjacent frames;

         a second step of selecting plural items of pixel data located respectively in a time directional periphery and a space directional periphery with respect to a target position in the second image signal based on the plurality of frames stored in the plurality of frame memory  
15 portions; and

         a third step of generating pixel data of the target position in the second image signal by using the plural items of pixel data selected by the second step,

         wherein in the second step,  
20 plural items of pixel data located in the space directional periphery with respect to the target position are selected from the frame memory portion in which a current frame in the first image signal is stored, said current frame corresponding to a frame in which the target position in the second image signal is present; and

25 plural items of pixel data located in the space directional periphery with respect to a position obtained by performing motion compensation on the target position by using the motion vector stored in the plurality of frame memory portions together with the pixel data, are

selected from the frame memory portions in which frames before and after the current frame are stored.

6. A computer-readable medium recording a program that causes  
5 a computer to perform a method for processing an image signal, in order to convert a first image signal constituted of plural items of pixel data into a second image signal constituted of plural items of pixel data, said method comprising:

a first step of storing pixel data of a plurality of consecutive  
10 frames of the first image signal in a plurality of frame memory portions together with a motion vector that corresponds to the pixel data and lies between mutually adjacent frames;

a second step of selecting plural items of pixel data located  
respectively in a time directional periphery and a space directional  
15 periphery with respect to a target position in the second image signal based on the plurality of frames stored in the plurality of frame memory portions; and

a third step of generating pixel data of the target position in  
the second image signal by using the plural items of pixel data selected  
20 by the second step,

wherein in the second step,

plural items of pixel data located in the space directional  
periphery with respect to the target position are selected from the frame  
memory portion in which a current frame in the first image signal is  
25 stored, said current frame corresponding to a frame in which the target position in the second image signal is present; and

plural items of pixel data located in the space directional  
periphery with respect to a position obtained by performing motion

compensation on the target position by using the motion vector stored in the plurality of frame memory portions together with the pixel data, are selected from the frame memory portions in which frames before and after the current frame are stored.

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7. A program that causes a computer to perform a method for processing an image signal, in order to convert a first image signal constituted of plural items of pixel data into a second image signal constituted of plural items of pixel data, said method comprising:

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a first step of storing pixel data of a plurality of consecutive frames of the first image signal in a plurality of frame memory portions together with a motion vector that corresponds to the pixel data and lies between mutually adjacent frames;

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a second step of selecting plural items of pixel data located respectively in a time directional periphery and a space directional periphery with respect to a target position in the second image signal based on the plurality of frames stored in the plurality of frame memory portions; and

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a third step of generating pixel data of the target position in the second image signal by using the plural items of pixel data selected by the second step,

wherein in the second step,

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plural items of pixel data located in the space directional periphery with respect to the target position are selected from the frame memory portion in which a current frame in the first image signal is stored, said current frame corresponding to a frame in which the target position in the second image signal is present; and

plural items of pixel data located in the space directional periphery with respect to a position obtained by performing motion compensation on the target position by using the motion vector stored in the plurality of frame memory portions together with the pixel data, are  
 5 selected from the frame memory portions in which frames before and after the current frame are stored.

8. A device for generating coefficient data that generates coefficient data for an estimation equation used when converting a first  
 10 image signal constituted of plural items of pixel data into a second image signal constituted of plural items of pixel data, said device comprising:

a plurality of frame memory portions for storing pixel data of a plurality of consecutive frames of a student signal that corresponds to the first image signal together with a motion vector that corresponds  
 15 to the pixel data and lies between mutually adjacent frames;

data selection means for selecting plural item of pixel data located respectively in a time directional periphery and a space directional periphery with respect to a target position in a teacher signal that corresponds to the second image signal based on the plurality  
 20 of frames stored in the plurality of frame memory portions; and

calculation means for obtaining the coefficient data by using the plural items of pixel data selected by the data selection means and pixel data of the target position in the teacher signal,

wherein the data selection means selects:

25 plural items of pixel data located in the space directional periphery with respect to the target position from the frame memory portion in which a current frame of the student signal is stored, said

current frame corresponding to a frame in which the target position in the teacher signal is present; and

plural items of pixel data located in the space directional periphery with respect to a position obtained by performing motion compensation on the target position by using the motion vector stored in the plurality of frame memory portions together with the pixel data, from the frame memory portions in which frames before and after the current frame are stored.

9. A method for generating coefficient data that generates coefficient data for an estimation equation used when converting a first image signal constituted of plural items of pixel data into a second image signal constituted of plural items of pixel data, said method comprising:

a first step of storing pixel data of a plurality of consecutive frames of a student signal that corresponds to the first image signal in a plurality of frame memory portions together with a motion vector that corresponds to the pixel data and lies between mutually adjacent frames;

a second step of selecting plural items of pixel data located respectively in a time directional periphery and a space directional periphery with respect to a target position in a teacher signal that corresponds to the second image signal based on the plurality of frames stored in the plurality of frame memory portions; and

a third step of obtaining the coefficient data by using the plural items of pixel data selected by the second step and pixel data of the target position in the teacher signal,

wherein in the second step,

plural items of pixel data located in the space directional periphery with respect to the target position are selected from the frame

memory portion in which a current frame of the student signal is stored, said current frame corresponding to a frame in which the target position in the teacher signal is present; and

plural items of pixel data located in the space directional periphery with respect to a position obtained by performing motion compensation on the target position by using the motion vector stored in the plurality of frame memory portions together with the pixel data, are selected from the frame memory portions in which frames before and after the current frame are stored.

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10. A computer-readable medium recording a program that causes a computer to perform a method for generating coefficient data, in order to generate coefficient data for an estimation equation used when converting a first image signal constituted of plural items of pixel data into a second image signal constituted of plural items of pixel data, said method comprising:

a first step of storing pixel data of a plurality of consecutive frames of a student signal that corresponds to the first image signal in a plurality of frame memory portions together with a motion vector that corresponds to the pixel data and lies between mutually adjacent frames;

a second step of selecting plural items of pixel data located respectively in a time directional periphery and a space directional periphery with respect to a target position in a teacher signal that corresponds to the second image signal based on the plurality of frames stored in the plurality of frame memory portions; and

a third step of obtaining the coefficient data by using the plural items of pixel data selected by the second step and pixel data of the target position in the teacher signal,



wherein in the second step,

plural items of pixel data located in the space directional periphery with respect to the target position are selected from the frame memory portion in which a current frame of the student signal is stored, said current frame corresponding to a frame in which the target position in the teacher signal is present; and

plural items of pixel data located in the space directional periphery with respect to a position obtained by performing motion compensation on the target position by using the motion vector stored in the plurality of frame memory portions together with the pixel data, are selected from the frame memory portions in which frames before and after the current frame are stored.

11. A program that causes a computer to perform a method for generating coefficient data, in order to generate coefficient data for an estimation equation used when converting a first image signal constituted of plural items of pixel data into a second image signal constituted of plural items of pixel data, said method comprising:

a first step of storing pixel data of a plurality of consecutive frames of a student signal that corresponds to the first image signal in a plurality of frame memory portions together with a motion vector that corresponds to the pixel data and lies between mutually adjacent frames;

a second step of selecting plural items of pixel data located respectively in a time directional periphery and a space directional periphery with respect to a target position in a teacher signal that corresponds to the second image signal based on the plurality of frames stored in the plurality of frame memory portions; and

a third step of obtaining the coefficient data by using the plural items of pixel data selected by the second step and pixel data of the target position in the teacher signal,

wherein in the second step,

5 plural items of pixel data located in the space directional periphery with respect to the target position are selected from the frame memory portion in which a current frame of the student signal is stored, said current frame corresponding to a frame in which the target position in the teacher signal is present; and

10 plural items of pixel data located in the space directional periphery with respect to a position obtained by performing motion compensation on the target position by using the motion vector stored in the plurality of frame memory portions together with the pixel data, are selected from the frame memory portions in which frames before and after  
15 the current frame are stored.